The TURA Science Advisory Board

Informational Briefing for the TURA Advisory Committee
Jan 2008

Enabling legislation

MGL Chapter 21I, Toxics Use Reduction Act, Section 6(J):

There shall be a Science Advisory Board associated with the Institute consisting of eleven members appointed by the governor, three members shall be nominated by the secretary of the executive office of environmental affairs, three members shall be nominated by the director of the Institute, three members shall be nominated by the director of economic development, one member shall be nominated by the director of labor and workforce development and one member shall be nominated by the secretary of the executive office of health and human services. Four of the initial appointees shall serve for an initial term of one year, four of the initial appointees shall serve for an initial term of two years, and all other appointees shall serve for three year terms. Each member shall have appropriate academic or professional experience. The institute shall consult with the board on issues including, but not limited to, additions and deletions to the toxic or hazardous substance list established in section 9 and the designation of substances as higher hazard substances and lower hazard substances. The members of the board shall serve without compensation, except that they may be reimbursed for out-of-pocket expenses incurred in the course of performing their duties as board members.

Current Science Advisory Board

The SAB currently consists of 10 members with various backgrounds and expertise. They come from various organizations including industry, academia, government and environmental groups and hold advanced degrees in chemistry, environmental science, toxicology, worker health, and public health.

The frequency of SAB meetings depends on the demands being placed on them by the program and their availability. The 2006 Amendments require a great deal of work by the board, and they have been meeting monthly for a half day, on average.

The SAB members elect a chairperson and co-chairperson to lead their board. The Toxics Use Reduction Institute supports the board by organizing and planning the agenda, scheduling meetings, gathering information, managing the expert judgment process, and recording minutes and recommendations. TURI's Director and SAB Manager, as well as a liaison from OTA and one from MassDEP, participate in discussions, but do not vote.

The SAB meetings are open to the public and are announced on TURI's web calendar.

University of Massachusetts Lowell • One University Avenue • Lowell, Massachusetts 01854-2866
Telephone: (978) 934-3275 FAX: (978) 934-3050

Overview of Recommendation Process

One of the main responsibilities of the SAB is to provide scientific recommendations for issues concerning the list of toxic or hazardous substances, including delisting substances, adding additional substances to the list, and categorizing the list on the basis of relative hazard. The SAB makes their recommendations to the Toxics Use Reduction Institute (TURI) based on the science, TURI then conducts a policy review and seeks input from the other TURA program agencies and the TURA Advisory Committee. A final recommendation is made to the Administrative Council based on this input as well as the science and policy implications. It is the responsibility of the Administrative Council to make the final decision about whether a substance will be added to or removed from the list, and whether it will be designated as a higher hazard or lower hazard substance.

The SAB Deliberation Process: The Delphi Method and the Expert Judgment Method

The term Delphi Method came from a study concerning the use of expert opinion called Project Delphi performed by the Rand Corporation in the 1950s for the U. S. Air Force. This study aimed to "obtain the most reliable consensus of opinion of a group of experts." The Delphi method is appropriate when "accurate information is unavailable or expensive to obtain or evaluation models require subjective inputs to the point where they become the dominating parameters." The rationale behind the method is that "if the opinion of one expert on an uncertain point is useful, the opinion of many experts - when boiled down to a single group opinion - should be even better." The original method uses a series of questionnaires to solicit the opinions of the experts. The results of the questionnaires are summarized by an investigator who provides feedback to the experts. A modified questionnaire is then used to obtain a second round of opinions and the process continues until consensus is reached.

In the late 1990's the SAB decided that it would be useful to the program to categorize the TURA chemical list into small sets of more hazardous chemicals and less hazardous chemicals, with the remaining chemicals being uncategorized. The Science Advisory Board considered many different algorithms for their initial categorization of the TURA chemical list, but found all of them lacking, particularly in the way they handled issues of uncertainty and missing data. An expert judgment method had been used by Polaroid Corporation to develop their groundbreaking chemical ranking system, and was determined by the board to be more satisfactory than the algorithm methods.

The Science Advisory Board's Expert Judgment Method for the original categorization began with each expert choosing fifty "more hazardous chemicals" and fifty "less hazardous chemicals", subsequently named Category 1 and Category 2 respectively. Each member used their own ranking scheme based on the data, their area of expertise and personal experiences. Board members areas of expertise are diverse including toxicology, public health, worker health and safety, and environmental chemistry. The votes from each expert were tabulated and the chemicals were ranked by the number of expert votes received for the category. The ranking served as the basis for discussion among the SAB members of the highest-ranked chemicals in each category, and the discussions resulted in consensus as to the chemicals to be placed in each category. The same method was used for the 2004 update which includes non-reported EPCRA 313 chemicals.

The 2006 TURA amendments required that the Board consider chemicals from their established More Hazardous list for Higher Hazard Status (and the established Less Hazardous list for Lower Hazard Status). The same criteria and method were used (each member choosing 10 potential Higher Hazard chemicals) to choose the recommended 11 Higher Hazard chemicals. For the Lower Hazard Chemicals, the SAB first considered the CERCLA-only Lower Hazard chemicals to determine which ones should be retained. The Board decided to take no action on 11 of the original 22 Lower Hazard Chemicals (meaning they drop from the list), so the Board then had 11 chemicals left as Lower Hazard Chemicals. The Science Advisory Board's methods were discussed during meetings of stakeholders convened to advise the legislature on the 2006 TURA Amendments. There was general support from those stakeholders for continuing to use the Expert Judgment Method to implement the 2006 Amendments.

Screening Endpoints Used by the Science Advisory Board

For all Science Advisory Board deliberations regarding the chemical list and categorization of the list, objective scientific hazard data are gathered for the substances in question. Data points are discussed in the following four major areas:

. human health
. environmental
. safety
. persistence/bioaccumulation

For categorization of the full EPCRA list, the Board discussed and chose the following eight screening endpoints:

- Carcinogenicity (IARC Classification)
- Oral LD50
- Reference dose (RFD)
- Threshold limit value (TLV) and/or permissible exposure limit (PEL)
- Aquatic LC50
- Flash point (FP)
- pH (used pKa and pKb)
- Bioconcentration factor (BCF)

In addition, the Board asked that the following endpoints be added prior to choosing the first 10 Higher Hazard Substances:

- Persistence, Bioaccumulation, and Toxicity values (PBT)
- Mutagenicity
- Developmental Toxicity
- Neurotoxicity
- Reproductive Toxicity
- Minimum Risk Levels (MRLs)

These endpoints were considered using the Expert Judgment Method for each chemical. Each chemical was considered for its overall potential impact, not only for a particular endpoint. For that reason the 11 recommended Higher Hazard chemicals are not necessarily the ones with the highest

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carcinogenicity or toxicity values, for instance. The recommended chemicals are the ones that the Board members, using expert judgment and the listed data, considered to be the highest hazard based on their inherent toxicity and safety hazards. It is important to note that the Board was not charged with looking at issues beyond safety/toxicity, such as quantities used in the state and exposure potential. TURI, in its policy analysis, considers issues around the use of the chemicals before making its recommendations to the Administrative Council.

Screening level data are often provided to the SAB members prior to the meeting, so that they can begin the expert judgment process. Based on these votes, the board members discuss each candidate substance, share their individual expertise with other members of the board, review issues of data gaps and uncertainty, and often request that additional information be gathered about particular areas of concern. When they are satisfied that they have sufficient information, the board votes and provides a formal recommendation to TURI, who then proceeds with the policy analysis and the next steps in the process.

Other Issues Brought to the SAB

In addition to issues around the toxic or hazardous substance list, the SAB is occasionally consulted on or informed about other scientific issues of concern to the TURA program. Those issues have included: emerging hazard information (including nanomaterials), TURA program evaluation methodologies, and alternatives assessment methodologies.